DUAL-AXIS HINGE MECHANISM

BACKGROUND

1. Technical Field

The present disclosure generally to hinge mechanisms and, more particularly, to a dual-axis hinge mechanism typically used for an electronic device.

2. Description of Related Art

An electronic device such as a mobile phone, a notebook computer, or a PDA (personal digital assistant), generally has a main body and a display cover. In general, the display cover is connected to the main body via a dual-axis hinge mechanism to realize rotating or folding-over functions, so as to facilitate adjustment of the position of the display cover relative to the user.

A typical dual-axis hinge mechanism includes a base seat, a first rotatable assembly, and a second rotatable assembly. The second rotatable assembly is pivotally connected to the base seat. The first rotatable assembly includes a pivotal shaft, a steady member, a rotary member, and an elastic member. The pivotal shaft is passed through the base seat, the steady member, and the rotary member. The base seat and the rotary member are rotatable relative to the pivotal shaft, and the steady member is non-rotatable relative to the pivotal shaft. The elastic member is configured for providing an axial force along the pivotal shaft such that the rotary member and the steady member abut each other. One of the rotary member and the steady member forms a protrusion, and the other one of rotary member and the steady member defines a recess for engaging with the protrusion. When an external force is applied to rotate the base seat and the rotary member around the pivotal shaft, the protrusion slides out of the recess, thus the base seat can be easily rotated to a desired position. Then the elastic force created by the elastic member in compressed state enable the rotary member and the steady member tightly contact each other, so that the base seat can be retained in the desired position by friction.

Because different electronic devices have a variety of display covers with different sizes and weights, different external forces are needed for rotating the display covers relative to the main bodies. However, while the typical dual-axis hinge mechanism may be used in different electronic devices, the external force for rotating the base seat is not adjustable, so the typical dual-axis hinge mechanism cannot meet different requirements. Thus the typical dual-axis hinge mechanism is inconvenient to use.

What is needed, therefore, is a new dual-axis hinge mechanism that overcomes the above mentioned disadvantages.

SUMMARY

A dual-axis hinge mechanism includes a base seat, a first rotatable assembly and a second rotatable assembly. The first rotatable assembly includes a rotary member rotatably assembled in the base seat, a steady member and an elastic member non-rotatably received in the base seat, and a fastening member. The rotary member includes a rotational shaft configured for extending through the steady member, the elastic member, the base seat, and then engages with the fastening member. Each of the rotary member and the steady member defines an engaging surface. The engaging surfaces movably engage with each other. One of the engaging surfaces forms a peak, and the other one of the engaging surfaces defines a valley corresponding to the peak. The fastening member is rotatable along the rotational shaft for adjusting an external force for rotating the rotary member. The second rotatable assembly includes a pivotal shaft fixed to the rotary member, and a bracket pivotally assembled on the pivotal shaft.

Other advantages and novel features will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The components in the drawings are not necessarily drawn to scale, the emphasis instead being placed upon clearly illustrating the principles of the present dual-axis hinge mechanism. Moreover, in the drawings, like reference numerals designate corresponding parts throughout the several views.

FIG. **1** is a schematic view of a notebook computer with a dual-axis hinge mechanism of one embodiment of the present disclosure.

FIG. **2** is an assembled view of the dual-axis hinge mechanism in FIG. **1**.

FIG. **3** is an exploded, isometric view of the dual-axis hinge mechanism in FIG. **2**.

FIG. **4** is similar to FIG. **3**, but viewed from another direction.

FIG. **5** is a partially cross-sectional view of the dual-axis hinge mechanism in FIG. **2**, showing a rotary member non-rotated relative to a steady member.

FIG. **6** is a partially cross-sectional view of the dual-axis hinge mechanism in FIG. **2**, showing the rotary member rotated an angle of 45 degrees relative to the steady member.

DETAILED DESCRIPTION OF THE EMBODIMENTS

The present dual-axis hinge mechanism can be used in electronic devices such as notebook computers, PDAs, or mobile phones. Hereinafter, for the purposes of conveniently describing an exemplary dual-axis hinge mechanism, an embodiment of the dual-axis hinge mechanism as used in a notebook computer is described and illustrated.

Referring to FIG. **1**, a notebook computer **200** with a dual-axis hinge mechanism **100** is shown. The notebook computer **200** includes a main body **201** and a display cover **203** pivotally connected to the main body **201** via the dual-axis hinge mechanism **100**.

Referring to FIG. **2**, the dual-axis hinge mechanism **100** includes a base seat **10**, a first rotatable assembly **20** pivotally assembled in the base seat **10**, and a second rotatable assembly **30** pivotally assembled with the first rotatable assembly **20**. The base seat **10** may be fixed to the main body **201**, and the second rotatable assembly **30** may be fixed to the display cover **203**. Thus, the display cover **203** can be rotated around an axis A relative to the main body **201** via the first rotatable assembly **20**, and can also be rotated around the axis B relative to the main body **201** via the second rotatable assembly **30**.

Referring to FIGS. **3** and **4**, the base seat **10** includes a housing **11** and a mounting portion **13** extending from a side of an outer sidewall of the housing **11**. The housing **11** is substantially barrel-shaped, and the housing **11** defines a generally polygonal cavity **112**. In a preferred embodiment, the cavity **112** is substantially square shaped with rounded corners. The housing **11** includes a bottom end **114**, and a through hole **116** defined in the bottom end **114** communicating with the cavity **112**. The mounting portion **13** is substantially L-shaped. A plurality of mounting holes **132** is defined in the mounting portion **13** for fixing the mounting portion **13** on the main body **201** of the notebook computer **200**. The mounting portion **13** includes a stopper portion **134** formed on a top surface of the mounting portion **13**.

The base seat **10** may be manufactured by a lightweight material such as casting magnesium alloy or aluminum alloy. The housing **11** and the mounting portion **13** may be inte-